L2 ANSWER 14 OF 16 CAPLUS COPYRIGHT 2001 ACS
TI Can ***glutamine*** ***synthetase*** activity levels be modulated in ***transgenic*** ***plants*** by the use of recombinant DNA technology?
AN 1994:601009 CAPLUS
DN 121:201009
TI Can ***glutamine*** ***synthetase*** activity levels be modulated in ***transgenic*** ***plants*** by the use of recombinant DNA technology?
AU Temple, Stephen J.; Bagga, Suman; Sengupta-Gopalan, Champa
CS Dep. Agronomy Horticulture, New Mexico State Univ., Las Cruces, MN, 88003, USA
SO Biochem. Soc. Trans. (1994), 22(4), 915-20
CODEN: BCSTB5; ISSN: 0300-5127
DT Journal
LA English
AB Cytosolic ***glutamine*** ***synthetase*** (GS1) regulation and function were studied by altering GS levels by either overexpressing GS1 genes or down-regulating GS1 gene expression by ***antisense*** RNA technol. in alfalfa and Lotus japonicus. GS1 in alfalfa is encoded by a multigene family and all members appear to be constitutively expressed. Increased GS1 subunit levels in L. japonicus transformants were accompanied by increased GS activity. However, no significant redn. in GS1 levels was obsd. in alfalfa and L. japonicus transformants with a full-length alfalfa GS1 cDNA in ***antisense*** orientation behind the CaMV 35S promoter. An ***antisense*** construct with a GS1 gene-specific region behind the CaMV 35S promoter down-regulated a subclass of GS1 genes in alfalfa transformants. GS1 subunit concn. could be modulated in alfalfa by driving an alfalfa GS1 coding sequence in sense and ***antisense*** orientation behind an organ/tissue-specific promoter. Overall, the results suggest that modulation of GS1 gene expression in these organisms does have physiol. repercussions.

L2 ANSWER 12 OF 16 CAPLUS COPYRIGHT 2001 ACS
TI Transformation and selection of maize tissue and the regeneration of stably transformed fertile ***plants***
AN 1995:708448 CAPLUS
DN 124:2539
TI Transformation and selection of maize tissue and the regeneration of stably transformed fertile ***plants***
IN Dams, Thomas R.; Anderson, Paul C.; Daines, Richard J.; Gordon-Kamm, William J.; Kausch, Albert P.; Mackey, Catherine J.; Orozco, Emil M., Jr.; Orr, Peter M.; Stephens, Michael A.
PA Dekalb Genetics Corp., USA
SO PCT Int. Appl., 350 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 6

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9506128	A2	19950302	WO 1994-US9699	19940824
WO 9506128	A3	19950914		

W: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, ES, FI, GB,

GE, HU, JP, KE, KG, KP, KR, KZ, LK, LT, LU, LV, MD, MG, MN, MW, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, UZ, VN
RW: KE, MW, SD, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG
CA 2170260 AA 19950302 CA 1994-2170260 19940824
AU 9477169 A1 19950321 AU 1994-77169 19940824
AU 684105 B2 19971204
EP 721509 A1 19960717 EP 1994-927962 19940824
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LI, LU, MC, NL, PT, SE
HU 74392 A2 19961230 HU 1996-425 19940824
BR 9407355 A 19970819 BR 1994-7355 19940824
ZA 9406488 A 19951130 ZA 1994-6488 19940825
ZA 9604217 A 19960826 ZA 1996-4217 19940825
AU 9856404 A1 19980604 AU 1998-56404 19980302
AU 712874 B2 19991118
PRAI US 1993-113561 A 19930825
WO 1994-US9699 W 19940824
AB A reproducible system for the prepn. of stable, genetically transformed maize cells, and methods of selecting cells that have been transformed are described. One method of selection uses the Streptomyces bar gene introduced by microprojectile bombardment into embryonic maize cells that are then grown in suspension cultures, followed by exposure to the herbicide bialaphos. Methods of achieving stable transformation include tissue culture methods and media, methods for the bombardment of recipient cells with transforming DNA, and methods of growing fertile ***plants*** from the transformed cells are described. The invention also relates to the transformed cells and seeds and to the fertile ***plants*** grown from the transformed cells and to their pollen.

L2 ANSWER 10 OF 16 CAPLUS COPYRIGHT 2001 ACS
TI Ammonium assimilation
AN 1998:345240 CAPLUS
DN 129:108612
TI Ammonium assimilation
AU Brugiere, N.; Suzuki, A.; Hirel, B.
CS Fr.
SO Assimilation Azote Plant. (1997), 85-107. Editor(s): Morot-Gaudry, Jean-Francois. Publisher: Institut National de la Recherche Agronomique, Paris, Fr.
CODEN: 66DIAL
DT Conference
LA French
AB The authors have transformed tobacco to overexpress cytosolic ***glutamine*** ***synthetase*** and glutamate synthase ***antisense*** RNA. Physiol. and mol. biol. aspects of ammonium assimilation by ***plants*** are discussed.

L2 ANSWER 9 OF 16 CAPLUS COPYRIGHT 2001 ACS
TI Manipulating the pathway of ammonia assimilation in ***transgenic*** nonlegumes and legumes
AN 1997:393954 CAPLUS
DN 127:161188
TI Manipulating the pathway of ammonia assimilation in ***transgenic*** nonlegumes and legumes

AU Hirel, Bertrand; Phillipson, Belinda; Murchie, Erik; Suzuki, Akira; Kunz, Caroline; Ferrario, Sylvie; Limami, Anis; Chaillou, Sylvain; Deleens, Eliane; Brugiere, Norbert; Chaumont-Bonnet, Muriel; Foyer, Christine; Morot-Gaudry, Jean Francois

CS Laboratoire Metabolisme Nutrition Plantes, I.N.R.A., Versailles, F-78026, Fr.

SO Z. Pflanzenernaehr. Bodenkd. (1997), 160(3), 283-290
CODEN: ZPBOAL; ISSN: 0044-3263

PB Wiley-VCH

DT Journal

LA English

AB The knowledge of the mol. controls of N assimilation was increased by the use of nonleguminous and leguminous ***plants*** with genetically altered capacities for ammonia assimilation. Using tobacco or Lotus as model ***plants*** , ***glutamine*** ***synthetase*** (GS) and glutamate synthase (GOGAT) activities were altered by stimulating or inhibiting in an organ- or tissue-specific manner the expression of the corresponding genes. In a few selected examples, the physiol. impact of these genetic manipulations was studied on ***plants*** grown under different N regimes. The use of such genetically-modified ***plants*** will allow better understanding of the mol. control of this metabolic pathway. It is also potentially of great importance in agriculture if such internal and stable modifications are beneficial in terms of N use efficiency, thus avoiding an excessive utilization of fertilizers or herbicides (GS inhibitors).

L2 ANSWER 6 OF 16 MEDLINE DUPLICATE 5

TI Down-regulation of specific members of the ***glutamine*** ***synthetase*** gene family in alfalfa by ***antisense*** RNA technology.

AN 1998278382 MEDLINE

DN 98278382 PubMed ID: 9617820

TI Down-regulation of specific members of the ***glutamine*** ***synthetase*** gene family in alfalfa by ***antisense*** RNA technology.

AU Temple S J; Bagga S; Sengupta-Gopalan C

CS Department of Agronomy and Horticulture, New Mexico State University, Las Cruces 88003, USA.

SO PLANT MOLECULAR BIOLOGY, (1998 Jun) 37 (3) 535-47.
Journal code: A6O; 9106343. ISSN: 0167-4412.

CY Netherlands

DT Journal; Article; (JOURNAL ARTICLE)

LA English

FS Priority Journals

EM 199806

ED Entered STN: 19980708
Last Updated on STN: 19980708
Entered Medline: 19980624

AB ***Glutamine*** ***synthetase*** (GS) catalyzes the ATP-dependent condensation of NH3 with glutamate to produce glutamine. In ***plants*** GS is an octameric enzyme and is located either in the cytoplasm (GS1) or in the chloroplast (GS2). Two distinct classes of GS1 genes with unique 3'-untranslated region (3'UTR) have been identified in alfalfa. We have demonstrated that the two classes exhibit differential expression pattern in the different ***plant*** organs suggesting different functional

roles for the different isozymes. To determine the functional significance of the two classes of GS1 genes in alfalfa, we have utilized ***antisense*** gene constructs aimed specifically at the 3'UTR of the two GS1 genes and introduced them individually into alfalfa. Our data show that the gene constructs are effective in lowering the corresponding transcript level very effectively though there were organ-specific differences in the level of reduction. No transcript corresponding to the ***antisense*** gene construct was detected in any of the alfalfa transformants though they accumulated to significant levels in ***transgenic*** tobacco containing the same construct. This suggests that the ***antisense*** transcript was not stable in the presence of the homologous target sequence. ***Transgenic*** alfalfa with up to 80% reduction in the transcript level corresponding to each gene class, however, showed no reduction in GS activity or GS1 polypeptide level. The results suggest that GS1 mRNA levels are not rate-limiting for GS1 polypeptide synthesis and that GS levels are controlled both at the transcriptional and translational/post-translational level.

L2 ANSWER 5 OF 16 SCISEARCH COPYRIGHT 2001 ISI (R)
TI Stable transformation of T1 and T2 ***transgenic*** alfalfa with ***antisense*** -lectin constructs
AN 1999:755600 SCISEARCH
GA The Genuine Article (R) Number: 241LZ
TI Stable transformation of T1 and T2 ***transgenic*** alfalfa with ***antisense*** -lectin constructs
AU Brill L M; Hirsch A M (Reprint)
CS UNIV CALIF LOS ANGELES, DEPT MOL CELL & DEV BIOL, 405 HILGARD AVE, LOS ANGELES, CA 90095 (Reprint); UNIV CALIF LOS ANGELES, DEPT MOL CELL & DEV BIOL, LOS ANGELES, CA 90095; UNIV CALIF LOS ANGELES, INST MOL BIOL, LOS ANGELES, CA 90095
CYA USA
SO SYMBIOSIS, (APR 1999) Vol. 27, No. 1, pp. 17-31.
Publisher: INT SCIENCE SERVICES/BALABAN PUBLISHERS, PO BOX 2039, REHOVOT 76120, ISRAEL.
ISSN: 0334-5114.
DT Article; Journal
FS AGRI
LA English
REC Reference Count: 24
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS
AB ***Antisense*** constructs of MsLEC1 and MsLEC2 (two of the three lectin genes found in alfalfa) have been introduced by Agrobacterium-mediated transformation into alfalfa cv. Regen. The resulting MsLEC1AS and MsLEC2AS primary ***transgenic*** lines were kanamycin-resistant and contained DNA that hybridized to nptII. In addition, Southern analysis demonstrated that some of the lectin gene-hybridizing bands were the same molecular weight as bands hybridizing to the nptII probe, indicating intact integration of the transgenes. Following self-pollination, we observed that pod and seed production, as well as viability of seeds from the self ed ***plants*** , were lower for the ***antisense*** lectin-expressing ***plants*** than for the controls. Seedlings derived from self ed ***antisense*** ***transgenic*** lines were also resistant to kanamycin, indicating that the transgenes were heritable.: Moreover, the T2 seedlings exhibited a number of severe developmental abnormalities that had been previously observed in T1 plantlets of comparable developmental age. These results

indicate that T2 ***antisense*** alfalfa lines are stably transformed and furthermore, that MsLEC1 and MsLEC2 are important for the early stages of alfalfa development.

L4 ANSWER 7 OF 14 CAPLUS COPYRIGHT 2001 ACS
TI Transgenic plants expressing a prokaryotic ammonium dependent asparagine synthetase
AN 1991:625415 CAPLUS
DN 115:225415
TI Transgenic plants expressing a prokaryotic ammonium dependent asparagine synthetase
IN Dudits, Denes; Paulovics, Katalin; Kalman, Katalin; Gyorgyey, Janos; Nagy, Ferenc; Bako, Laszlo; Horvath, Gabor; Eckes, Peter; ***Donn, Guenter***
PA Magyar Tudomanyos Akademia, Szegedi Biologiai Kozpontja, Hung.; Hoechst A.-G.
SO PCT Int. Appl., 21 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 9111524	A1	19910808	WO 1991-EP120	19910122
W: AU, CA, HU, JP, KR, PL, SU, US				
RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LU, NL, SE				
AU 9171768	A1	19910821	AU 1991-71768	19910122
EP 511979	A1	19921111	EP 1991-902058	19910122
EP 511979	B1	19940810		
R: DE, DK, FR, GB, NL				
HU 65648	A2	19940728	HU 1992-2437	19910122
CN 1053641	A	19910807	CN 1991-100460	19910125
ZA 9100568	A	19911030	ZA 1991-568	19910125
CZ 283506	B6	19980415	CZ 1991-165	19910125
SK 279160	B6	19980708	SK 1991-165	19910125
US 5545819	A	19960813	US 1994-360176	19941220
US 5723762	A	19980303	US 1995-465526	19950605
PRAI EP 1990-101537		19900126		
WO 1991-EP120		19910122		
US 1992-910262		19920924		
US 1993-116045		19930902		
US 1994-238203		19940504		
US 1994-360176		19941220		

AB A gene for a microbial ammonium-dependent asparagine synthetase is expressed in transgenic plants. Expression of the gene makes the plants more tolerant of herbicides that inhibit ***glutamine*** ***synthetase*** . The asnA gene of Escherichia coli was placed under the control of the promoter of the gene for the small subunit of ribulose-bis-phosphate carboxylase and introduced into tobacco leaf disks by Agrobacterium. Phosphinothricin-resistant plants were selected and selfed to show segregation of a single gene for phosphinothricin resistance. Plants carrying the asnA gene accumulated ammonia more slowly than control plants in 48 h after spraying with phosphinothricin at 1 kg/ha. Transgenic plants grew somewhat faster than controls (120%) and growth was accelerated by the application of low levels of phosphinothricin (.apprx.180%).

L6 ANSWER 2 OF 15 SCISEARCH COPYRIGHT 2001 ISI (R)
TI THE MOLECULAR-GENETICS OF NITROGEN ASSIMILATION INTO AMINO-ACIDS IN HIGHER-PLANTS
AN 96:480479 SCISEARCH
GA The Genuine Article (R) Number: UT119
TI THE MOLECULAR-GENETICS OF NITROGEN ASSIMILATION INTO AMINO-ACIDS IN HIGHER-PLANTS
AU LAM H M (Reprint); COSCHIGANO K T; OLIVEIRA I C; MELOOLIVEIRA R; ***CORUZZI G M***
CS NYU, DEPT BIOL, NEW YORK, NY, 10003 (Reprint)
CYA USA
SO ANNUAL REVIEW OF PLANT PHYSIOLOGY AND PLANT MOLECULAR BIOLOGY, (1996) Vol.
47, pp. 569-593.
ISSN: 0066-4294.
DT General Review; Journal
FS LIFE; AGRI
LA ENGLISH
REC Reference Count: 149
ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS
AB Nitrogen assimilation is a vital process controlling plant growth and development. Inorganic nitrogen is assimilated into the amino acids glutamine, glutamate, asparagine, and aspartate, which serve as important nitrogen carriers in plants. The enzymes ***glutamine*** ***synthetase*** (GS), glutamate synthase (GOGAT), glutamate dehydrogenase (GDH), aspartate aminotransferase (AspAT), and asparagine synthetase (AS) are responsible for the biosynthesis of these nitrogen-carrying amino acids. Biochemical studies have revealed the existence of multiple isoenzymes for each of these enzymes. Recent molecular analyses demonstrate that each enzyme is encoded by a gene family wherein individual members encode distinct isoenzymes that are differentially regulated by environmental stimuli, metabolic control, developmental control, and tissue/cell-type specificity. We review the recent progress in using molecular-genetic approaches to delineate the regulatory mechanisms controlling nitrogen assimilation into amino acids and to define the physiological role of each isoenzyme involved in this metabolic pathway.

1: Plant J 1991 Nov;1(3):275-80

A gene network controlling glutamine and asparagine biosynthesis in plants.

McGrath RB, Coruzzi GM.

Rockefeller University, New York, NY 10021.

Publication Types:
- Review
- Review, Tutorial

PMID: 1688250 [PubMed - indexed for MEDLINE]

1: Plant Mol Biol 1992 Oct;20(2):207-18

Related Articles, Nucleotide, Protein, NEW Books

PubMed Services

Related Resources

Forcing expression of a soybean root glutamine synthetase gene in tobacco leaves induces a native gene encoding cytosolic enzyme.

Hirel B, Marsolier MC, Hoarau A, Hoarau J, Brangeon J, Schafer R, Verma DP.

Laboratoire du Metabolisme et de la Nutrition des Plantes, C.N.R.A., Versailles, France.

Glutamine synthetase (GS; EC 6.3.1.2) is present in different subcellular compartments in plants. It is located in the cytoplasm in root and root nodules while generally present in the chloroplasts in leaves. The expression of GS gene(s) is enhanced in root nodules and in soybean roots treated with ammonia. We have isolated four genes encoding subunits of cytosolic GS from soybean (Glycine max L. cv. Prize). Promoter analysis of one of these genes (GS15) showed that it is expressed in a root-specific manner in transgenic tobacco and Lotus corniculatus, but is induced by ammonia only in the legume background. Making the GS15 gene expression constitutive by fusion with the CaMV-35S promoter led to the expression of GS in the leaves of transgenic tobacco plants. The soybean GS was functional and was located in the cytoplasm in tobacco leaves where this enzyme is not normally present. Forcing this change in the location of GS caused concomitant induction of the mRNA for a native cytosolic GS in the leaves of transgenic tobacco. Shifting the subcellular location of GS in transgenic plants apparently altered the nitrogen metabolism and forced the induction in leaves of a native GS gene encoding a cytosolic enzyme. The latter is normally expressed only in the root tissue of tobacco. This phenomenon may suggest a hitherto uncharacterized metabolic control on the expression of certain genes in plants.

PMID: 1356501 [PubMed - indexed for MEDLINE]

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(FILE 'HOME' ENTERED AT 10:29:18 ON 11 NOV 2001)

FILE 'MEDLINE, CAPLUS, EMBASE, BIOSIS, SCISEARCH' ENTERED AT 10:29:33 ON 11 NOV 2001

L1 31 S PLANT AND TRANSGENIC AND (ANTISENSE OR ANTI-SENSE) AND GLUTAM
L2 16 DUPLICATE REMOVE L1 (15 DUPLICATES REMOVED)
L3 19 S DONN?/AU AND GLUTAMINE SYNTH?
L4 14 DUPLICATE REMOVE L3 (5 DUPLICATES REMOVED)
L5 29 S CORUZZI?/AU AND GLUTAMINE SYNTH? AND TRANSGENIC
L6 15 DUPLICATE REMOVE L5 (14 DUPLICATES REMOVED)

Ammonia-regulated expression of a soybean gene encoding cytosolic glutamine synthetase in transgenic Lotus corniculatus.

Miao GH, Hirel B, Marsolier MC, Ridge RW, Verma DP.

Department of Molecular Genetics and Biotechnology Center, Ohio State University, Columbus 43210.

A full-length cDNA clone encoding cytosolic glutamine synthetase (GS), expressed in roots and root nodules of soybean, was isolated by direct complementation of an Escherichia coli gln A- mutant. This sequence is induced in roots by the availability of ammonia. A 3.5-kilobase promoter fragment of a genomic clone (lambda GS15) corresponding to this cDNA was isolated and fused with a reporter [beta-glucuronidase (GUS)] gene. The GS-GUS fusion was introduced into a legume (Lotus corniculatus) and a nonlegume (tobacco) plant by way of Agrobacterium-mediated transformations. This chimeric gene was found to be expressed in a root-specific manner in both tobacco and L. corniculatus, the expression being restricted to the growing root apices and the vascular bundles of the mature root. Treatment with ammonia increased the expression of this chimeric gene in the legume background (i.e., L. corniculatus); however, no induction was observed in tobacco roots. Histochemical localization of GUS activity in ammonia-treated transgenic L. corniculatus roots showed a uniform distribution across all cell types. These data suggest that the tissue specificity of the soybean cytosolic GS gene is conserved in both tobacco and L. corniculatus; however, in the latter case, this gene is ammonia inducible. Furthermore, the ammonia-enhanced GS gene expression in L. corniculatus is due to an increase in transcription. That this gene is directly regulated by externally supplied or symbiotically fixed nitrogen is also evident from the expression of GS-GUS in the infection zone, including the uninfected cells, and the inner cortex of transgenic L. corniculatus nodules, where a flux of ammonia is encountered by this tissue. The lack of expression of GS-GUS in the outer cortex of the nodules suggests that ammonia may not be able to diffuse outside the endodermis.

PMID: 1688099 [PubMed - indexed for MEDLINE]